

# Physics 2B03 Electricity—Course Outline

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Instructor: Neil McKay            ABB-261    *mckay@physics.mcmaster.ca*  
Lab Supervisor: Kenrick Chin        NRB-120    *chin@mcmaster.ca*

Physics 2B3 is a course in electrostatics and DC circuits. The course will teach the fundamental principles of fields produced by stationary charges. We will introduce the divergence, gradient, and laplacian operators, and present Gauss's Law in integral and differential form.

A second focus of the course is DC circuits. The student will learn general methods to analyse circuits containing resistors, capacitors, batteries, and switches. If time permits, we may include a brief introduction to semiconductor devices. The laboratory portion of the course gives the student experience in electrical measurements.

Physics 2BB3 (Magnetism) is the natural continuation to Physics 2B03, adding magnetism, AC circuits, and electrodynamics.

**Textbook:** **Physics for Scientists and Engineers with modern Physics, eighth edition**, by Serway and Jewett, published by Brooks/Cole. This was the required text last year in Physics 1B03 and Physics 1BA3; so most students will already have a copy. We will cover all of the material from chapters 23 to 28, and some portions of chapter 43 if time permits. From time to time, supplementary material will be posted on Avenue if required.

**Lab Manual:** *There is no printed lab manual. The lab instructions will be posted on Avenue to Learn before each lab.*

**Calculator:** Only the McMaster prescribed calculator (Casio *fx-991*) is permitted in tests.

**"i>clicker":** The "i>clicker" response unit is on sale at the bookstore. We will use this frequently in class

**Marks:** Grade weightings are given below. Averaging and combining of marks is done on a 100-point scale.

Final examination	45%
Two midterm tests	20% (10% each)
Clicker Quizzes (in lectures)	5%
Assignments	10%
Labs	20%

**All four labs must be completed, and reports submitted, to pass the course.** If a lab is not completed by the end of term, the grade for the course is F.

**Clicker Quizzes:** Full marks will be given for answering all of the quizzes, with a sufficient number of correct answers, in at least 85% of the lectures.

**Tests:** Two tests of 45 minutes each, during the lecture period. Dates to be arranged.

**Laboratory:** Students complete four labs during the term..

Reading assignments, Laboratory instructions, test details, and other information will be posted regularly on **Avenue to Learn** (<http://avenue.mcmaster.ca>). You should check the Avenue page frequently.

Problems will be assigned from the textbook (Serway and Jewett, eighth edition), approximately weekly.

### **Additional Reading (optional):**

A few topics in this course which require more than first-year calculus are not covered completely in the Serway text. For the interested student, *Introduction to Electrodynamics*, by David Griffiths (Prentice-Hall), covers electrostatics at a more advanced level, and is concise and readable. *Electricity and Magnetism, third edition*, by Edward Purcell and David Morin (Cambridge University Press, 2013) is a recent update of an excellent and readable book by Purcell (the earlier editions used gaussian units, which may be confusing at first). Purcell's unusual approach assumes a familiarity with special relativity in some chapters, but is generally aimed at students in second year. *The Feynman Lectures on Physics, Volume 2*, by Richard Feynman (like Edward Purcell, a Nobel laureate) presents many interesting and original examples and derivations, though some would be easier to follow *after* completing a course in electromagnetism.

### ***Academic Integrity***

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. a grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty") and/or suspension or expulsion from the university.

It is your responsibility to understand what does constitute academic dishonesty . For information on the various kinds of academic dishonesty, please refer to the Academic Integrity Policy, specifically Appendix 3, located at

<http://www.mcmaster.ca/academicintegrity/index.html>

The following examples illustrate only three forms of academic dishonesty:

1. Plagiarism, i.e. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

In this course all students are expected to work independently. ***As in all scientific reporting, the work submitted must be the participants' individual's own work.*** You are encouraged to discuss assignment problems and the labs with other students, and to share ideas about general approaches to a question. However, each student should work out the final details independently, and write up a report or solution without referring to any written solution or rough work from any other source.

**The instructor and university reserve the right to modify elements of the course during the term.** *Any necessary changes to dates, deadlines, marks weightings, etc. will be communicated to you through the course website and/or [avenue.mcmaster.ca](http://avenue.mcmaster.ca).*